What is claimed is:

1. A method for presenting weather data and related data for use in aviation, the method comprising:

providing presently measured or estimated values for each of a selected subset of a set of selected situation parameters, where the situation parameter set comprises trip length, present phase of trip, trip departure time, distance from present location to a selected aircraft destination, visibility, ceiling or cloud cover, longitudinal wind speed, cross wind speed, wind gust speed, temperature, dew point and density altitude;

providing a reference database containing a collection of N reference situations, numbered n = 1, ... , N ($N \geq 2$), with each reference situation being characterized by an ordered set of parameter value ranges, one range for each of the selected subset of parameters; and

when the measured or estimated value of each situation parameter in the selected subset lies within the corresponding value range for the parameter, displaying a selected subset of weather data, in at least one of visually perceptible format and audibly perceptible format, where the subset of weather data is drawn from a set of weather data that comprises a measured value or estimated value of at least one of aircraft present altitude, static air pressure at aircraft present altitude, longitudinal wind speed, crosswind speed, wind gust speed, wind variability, wind vector direction, temperature, dew point, temperature-dewpoint spread, density altitude, sky condition for at least one altitude range, ground visibility at a selected aircraft destination, ground precipitation at the selected destination, visibility obscurations along aircraft flight route, ceiling, distance from the selected destination, fuel required to reach the selected destination, recommended runway

for the selected destination, and time of most recent measurement upon which the subset of weather data is based.

2. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {pre-departure, takeoff, ascent and cruise}, AND (2) $v_w(\text{present;dest}) - v_w(\text{forecast;dest}) \geq \Delta v_w(\text{thr})$, where $\Delta v_w(\text{thr})$ is a selected positive value; and

when each of the selected set of conditions is satisfied, displaying estimated fuel required to move from aircraft present location to said destination in at least one of a visually perceptible format and an audibly perceptible format.

3. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set conditions consisting of: (1) trip phase being one of {pre-departure, takeoff, ascent and cruise}, AND (2) at least one of the following inequalities is satisfied: $\{\{\Delta T(\text{dew;dest}) \leq \Delta T(\text{dew;thr})\}$ OR $\{VIS(\text{dest}) \leq VIS(\text{dest;thr})\}$ OR $\{Ce(\text{dest}) \leq Ce(\text{dest;thr})\}$ OR $\{v_w(\text{long;dest}) \geq v_w(\text{long;thr})\}$ OR $\{v_w(\text{cr;dest}) \geq v_w(\text{cr;thr})\}\}$, where $\Delta T(\text{dew;thr})$, $VIS(\text{dest;thr})$, $Ce(\text{dest;thr}$, $v_w(\text{long;thr})$ and $v_w(\text{cr;thr})$ are selected threshold values; and

when each of the selected set of conditions is satisfied, displaying at least one of $\Delta T(\text{dew;dest})$, $VIS(\text{dest})$, $Ce(\text{dest})$, $v_w(\text{long;dest})$ and $v_w(\text{cr;dest})$ in at least one of a visually perceptible format and an audibly perceptible format.

4. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {pre-departure, takeoff, ascent and cruise}, AND (2) at least one of the following inequalities is satisfied: {{VIS(dest) ≤ VIS(dest;thr)} OR {Ce(dest) ≤ Ce(dest;thr)} OR {v_w(long;dest) ≥ v_w(long;thr)} OR {v_w(cr;dest) ≥ v_w(cr;thr)}}, where VIS(dest;thr), Ce(dest;thr), v_w(long;thr) and v_w(cr;thr) are selected threshold values; and

when each of the selected set of conditions is satisfied, displaying at least one of VIS(dest), Ce(dest), v_w(long;dest) and v_w(cr;dest) in at least one of a visually perceptible format and an audibly perceptible format.

5. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {approach}, AND (2) at least one of the following inequalities is satisfied: {{h(dens;dest) ≥ h(dens;dest;thr)} OR {VIS(dest) ≤ VIS(dest;thr)} OR {Ce(dest) ≤ Ce(dest;thr)} OR {v_w(long;dest) ≥ v_w(long;thr)} OR {v_w(cr;dest) ≥ v_w(cr;thr)}}, where h(dens;dest;thr), VIS(dest;thr), Ce(dest;thr), v_w(long;thr) and v_w(cr;thr) are selected threshold values; and

when each of the selected set of conditions is satisfied, displaying at least one of h(dens(dest;thr), VIS(dest), Ce(dest), v_w(long;dest), v_w(cr;dest) and recommended runway at said selected destination in at least one of a visually perceptible format and an audibly perceptible format.

6. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {approach}, AND (2) at least one of the following inequalities is satisfied: {{VIS(dest) ≤ VIS(dest;thr)} OR {Ce(dest) ≤ Ce(dest;thr)} OR {v_w(long;dest) ≥ v_w(long;thr)} OR {v_w(cr;dest) ≥ v_w(cr;thr)}}, where VIS(dest;thr), Ce(dest;thr), v_w(long;thr) and v_w(cr;thr) are selected threshold values; and

when each of the selected set of conditions is satisfied, displaying at least one of VIS(dest), Ce(dest), v_w(long;dest), v_w(cr;dest) and recommended runway at said selected destination in at least one of a visually perceptible format and an audibly perceptible format.

7. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {cruise}, AND (2) at least one of the following inequalities is satisfied: {{h(dens;NANYFB) ≥ h(dens;NANYFB;thr)} OR {VIS(NANYFB) ≤ VIS(NANYFB;thr)} OR {Ce(NANYFB) ≤ Ce(dest;thr)}}, where h(dens;NANYFB;thr), VIS(NANYFB;thr) and Ce(NANYFB;thr) are selected threshold values and "NANYFB" refers to an airport within a selected transverse distance from said flight route that has not yet been flown past by said aircraft; and

when each of the selected set of conditions is satisfied, displaying at least one of location of NANYFB, h(dens(NANYFB;thr), VIS(NANYFB), Ce(NANYFB) and recommended runway at said selected destination in at least one of a visually perceptible format and an audibly perceptible format.

8. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {cruise}, AND (2) at least one of the following inequalities is satisfied: { {VIS(NANYFB) ≤ VIS(NANYFB;thr)} OR {Ce(NANYFB) ≤ Ce(dest;thr)}}, where VIS(NANYFB;thr) and Ce(NANYFB;thr) are selected threshold values and "NANYFB" refers to an airport within a selected transverse distance from said flight route that has not yet been flown past by said aircraft; and

when each of the selected set of conditions is satisfied, displaying at least one of location of NANYFB, VIS(NANYFB), Ce(NANYFB) and recommended runway at said selected destination in at least one of a visually perceptible format and an audibly perceptible format.

9. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected condition consisting of: at least one of the following inequalities is satisfied: {{VIS(forecast; dest) – VIS(present;dest) ≥ ΔVIS(thr)}, OR {Ce(forecast;dest) – Ce(present;dest) ≥ ΔCe(thr)} OR{ ΔT(dew;dest) ≤ ΔT(dew;thr)} OR {v_w(long;dest) ≥ v_w(long;thr)} OR {v_w(cr;dest) ≥ v_w(cr;thr)}}, where ΔVIS(thr), ΔCe(thr), ΔT(dew;thr), v_w(long;thr) and v_w(cr;thr) are selected positive values}; and

when the selected condition is satisfied, displaying at least one of VIS(present;dest), Ce(present;dest), ΔT(dew;dest), v_w(long;dest) and v_w(cr;dest) in at least one of a visually perceptible format and an audibly perceptible format.

10. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected condition consisting of: at least one of the following inequalities is satisfied {{VIS(forecast; dest) – VIS(present;dest) ≥ ΔVIS(thr)}, OR {Ce(forecast;dest) – Ce(present;dest) ≥ ΔCe(thr)} OR {v_w(long;dest) ≥ v_w(long;thr)} OR {v_w(cr;dest) ≥ v_w(cr;thr)}}, where ΔVIS(thr), ΔCe(thr), v_w(long;thr) and v_w(cr;thr) are selected positive values}; and

when the selected condition is satisfied, displaying at least one of VIS(present;dest), Ce(present;dest), v_w(long;dest) and v_w(cr;dest) in at least one of a visually perceptible format and an audibly perceptible format.

11. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: (1) trip phase being one of {cruise, descent, approach} AND (2) {Δs(dest) ≤ Δs(thr)} AND (3) at least one of the following inequalities is satisfied: {{v_w(cr;dest) ≥ v_w(cr;thr)} OR {v_w(gust;dest) ≥ v_w(gust;thr)}}, where v_w(cr;thr) and v_w(gust;thr) are selected threshold values; and

when each of the selected set of conditions is satisfied, displaying at least one of v_w(cr;dest), v_w(gust;dest) and recommended runway at said selected destination in at least one of a visually perceptible format and an audibly perceptible format.

12. The method of claim 1, further comprising:

choosing at least one of said reference situations to comprise a selected set of conditions consisting of: for a set of METAR weather parameter values WP(METAR;m) and a set of corresponding TAF weather parameter values WP(TAF;m) (m = 1, ... , M; M≥1), a weather parameter difference, |WP(METAR;m) – WP(TAF;m)| is at least equal to a selected threshold value ΔWP(m;thr) for at least one number, m=m'; and

when the selected set of conditions is satisfied, displaying at least one of WP(METAR;m') and WP(TAF;m') in at least one of a visually perceptible format and an audibly perceptible format.

13. The method of claim 1, further comprising:

choosing at least one of said reference situations to further comprise a situation in which a trip length preference, including at least one of "short," "medium" or "long," is provided; and

displaying said selected subset of weather data for a given trip only if the length of the given trip is included in the provided trip length preference.

14. The method of claim 1, further comprising providing a reference database modification module that implements at least one of: (i) change of said range for at least one of said parameters in said selected subset; (ii) deletion of a parameter in said selected subset and deletion of said corresponding value range; (iii) addition of a parameter to said selected subset and addition of a corresponding value range for the added parameter; and (iv) specification of at least one of said visually perceptible display and said audibly perceptible display for said display of

said selected subset of weather data.

15. The method of claim 1, wherein said subset of said situation parameters is determined by a process comprising:

providing a selected subset of N1 parameters, denoted p_{n1} (n1 = 1, ... , N1; N1≥1) from said set of situation parameters;

for a set of measured or estimated values of the parameter p_{n1}, for which a pilot requests said display of said selected set of weather data, providing a present-maximum value $p_{n1}(max)$ = maximum of measured or estimated values of the parameter p_{n1}; and

receiving a new measured or estimated value of the parameter p_{n1}, denoted $p_{n1}(new)$, defining an updated present-maximum value of the parameter p_{n1} as $p_{n1}(max;updated) = max\{p_{n1}(max), p_{n1}(new)\}$, and replacing the value $p_{n1}(max)$ by the value $p_{n1}(max;updated)$.

16. The method of claim 1, wherein said subset of said situation parameters is determined by a process comprising:

providing a selected subset of N2 parameters, denoted q_{n2} (n2 = 1, ... , N2; N2≥1), from said set of situation parameters;

for a set of measured or estimated values of the parameter q_{n2}, for which a pilot requests said display of said selected set of weather data, providing a present-minimum value $q_{n2}(min)$ = minimum of measured or estimated values of the parameter q_{n2}; and

receiving a new measured or estimated value of the parameter q_{n2}, denoted $q_{n2}(new)$, defining an updated present-minimum value of the parameter q_{n2} as

$q_{n2}(min;updated) = min\{q_{n2}(min), q_{n2}(new)\}$, and replacing the value $q_{n2}(min)$ by the value $q_{n2}(min;updated)$.

17. The method of claim 1, wherein said subset of said situation parameters is determined by a process comprising:

providing a selected subset of N3 parameters, denoted r_{n3} (n2 = 1, ... , N3; N3≥1), from said set of situation parameters;

for a set of measured or estimated values of the parameter r_{n3}, for which a pilot requests said display of said selected set of weather data, providing a present-statistical average value $r_{n3}(avg)$ = average of measured or estimated values of the parameter r_{n3}; and

receiving a new measured or estimated value of the parameter r_{n3}, denoted $r_{n3}(new)$, defining an updated present-average value of the parameter r_{n3} as $r_{n3}(avg;updated) = average\{r_{n3}(avg), r_{n3}(new)\}$, and replacing the value $r_{n3}(avg)$ by the value $r_{n3}(avg;updated)$.

18. The method of claim 1, wherein said subset of said situation parameters is determined by a process comprising

providing a selected subset of N4 parameters, denoted r'_{n4} (n4 = 1, ... , N4; N4≥1), from said set of situation parameters;

for a set of measured or estimated values of the parameter r'_{n4}, for which a pilot requests said display of said selected set of weather data, providing a sequence of parameter value ranges, $r'_{n4,j} < r'_{n4} \leq r'_{n4,j+1}$ (j = 1, ... , J-1; J≥2); for the measured or estimated values of the parameter r'_{n4}; and

receiving a new measured or estimated value of the parameter r'_{n4}, denoted $r'_{n4}(new)$, and determining if the new parameter value satisfies $r'_{n4,j} < r'_{n4}(new) \leq r'_{n4,j+1}$ for at least one of the parameter value ranges.

19. The method of claim 1, further comprising:

providing a list of alternate weather data comprising at least one of the following data items: METAR data, nearest IFR, nearest VFR, density altitude, wind velocity, cross wind, wind gust, visibility, ceiling, elevation, weather frequency, suggest runway at said selected destination, traffic pattern at said selected destination, airport information and highlight destination; and

verbally entering a selected audible display phrase including specification of one of the data items in order to provide an audibly perceptible display of information concerning the specified data item;

20. The method of claim 1, further comprising:

providing a list of alternate weather data comprising at least one of the following data items: METAR, nearest IFR, nearest VFR, density altitude, wind velocity, cross wind, wind gust, visibility, ceiling, elevation, weather frequency, suggest runway at said selected destination, traffic pattern, airport information and highlight destination; and

verbally entering a selected visual display phrase including specification of one of the data items in order to provide a visually perceptible display of information concerning the specified data item;

21. The method of claim 1, further comprising:

providing a list of alternate weather data comprising at least one of the following data items: METAR and highlight destination; and

visually entering a selected visual display phrase including specification of one of the data items in order to provide a visually perceptible display of information concerning the specified data item;